Postoperative pseudoepileptic seizures in a known epileptic: complications in recovery

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A 47-yr-old woman underwent general anaesthesia for a squint correction. She had previously suffered a cerebral venous thrombosis, presenting as grand mal seizures during recovery from general anaesthesia for minor surgery. Subsequently, she was affected by Jacksonian limb seizures and petit mal epilepsy and had required long-term rehabilitation, and anticonvulsant and anticoagulant therapy. On arrival in recovery on this occasion, with a laryngeal mask airway (LMA) in place, she started to convulse. The seizures were initially treated with midazolam i.v., but they recurred. Whilst observing the seizure pattern and excluding the differential diagnoses, evidence emerged that psychological factors had played a large part in her clinical picture. Her differential diagnosis had recently been amended to include ‘pseudoseizures’. A firm, supportive approach caused the ‘convulsions’ to cease within a few hours.

Keywords: anaesthesia, general; complications; recovery

Accepted for publication: May 19, 2003

Although pseudoseizures (also known as psychogenic seizures) are well documented in the neurological literature,1–5 little has been written about their incidence, modification or management in the postoperative setting. They may mimic shivering, may occur before apparent recovery from general anaesthesia, and may be modified postoperatively by the residual effects of anaesthesia. They may also occur in conjunction with epilepsy. They should be considered early in the differential diagnosis of postoperative shaking, as they may be more likely than epilepsy in this setting. It also seems that early diagnosis and appropriate management may prevent morbidity from both inappropriate treatment and the development of pseudostatus epilepticus. Thus we present this case to illustrate that psychogenic seizures should be considered and may present in a variable manner after surgery.

Case report

A 47-yr-old female healthcare worker was admitted to hospital for a two-stage eye procedure: correction of a long-standing left-sided squint, and subsequent adjustment of sutures after recovery from anaesthesia. The latter part of the operation requires awake cooperation, to enable the surgeon to take voluntary extraocular eye movements into account.

Two years previously, she had developed seizures during recovery from her first ever general anaesthetic, which was for minor surgery. Urgent investigation had revealed an extensive left upper circulation venous thrombosis, extending to the cerebral venous sinus. Haematological work-up had shown this to be associated with elevated levels of Factor VIIIc, although subsequent investigation did not identify any inherited or acquired thrombophilia. She had undergone extensive neurological rehabilitation and had initially been treated with sodium valproate and warfarin. Since then, she had been affected by both Jacksonian seizures of the limbs and petit mal epilepsy, left facial weakness, headache and malaise. Various anticonvulsants had subsequently been tried, with limited success. One year previously, she had suffered a minor subdural haematoma secondary to poor anticoagulant control and her treatment was then changed to Fragmin. This had all occurred at a significant cost to her professionally, socially and emotionally.

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Preoperatively in the ward she was somewhat subdued, but appeared to have grossly normal neurology, with normal electrolytes and an activated partial thromboplastin time of 1.6. She had omitted her Fragmin that morning but had continued aspirin, on the advice of the haematologists. She underwent a short, uneventful general anaesthetic lasting 45 min with propofol, fentanyl and ondansetron, breathing isoflurane, nitrous oxide and oxygen spontaneously through a laryngeal mask airway (LMA). No vagal responses were recorded intraoperatively. Approximately 3 min after arrival in recovery, before showing signs of regaining consciousness and before expulsion of the LMA, she started to convulse; the head, neck and all four limbs were involved. The LMA was removed and airway, breathing and circulation were assessed as adequate. Oxygen was administered by facemask and she was turned to the lateral position and protected from injury. Blood sugar, electrolytes and temperature were normal. Midazolam 10 mg was titrated i.v. to good effect as a temporizing measure. However, the episodes started to recur within minutes with increasing frequency and intensity.

Because of her history of perioperative cerebral thrombosis, convulsions and partial reversal of anticoagulant therapy, an urgent diagnosis was required. Differential diagnosis included an epileptic seizure, a further acute neurological event, a drug reaction or withdrawal, metabolic disturbance, shivering or hysteria. A further acute neurological event due to thrombosis or bleed was initially feared, even though the general anaesthetic had been short and uneventful. A straightforward epileptic seizure was also a possibility, either as a coincidental event or provoked by the epileptogenic characteristics of propofol. She had no obvious features of drug or alcohol abuse and acute withdrawal appeared unlikely. Core temperature was 36.4°C. Hysteria was deemed unlikely as she had appeared calm preoperatively and the fits had started before apparent recovery from anaesthesia.

Observation of her fits for the next 30 min, however, suggested that they were not of a classical pattern. They were dramatic, lasting 20–30 s and involved fast, symmetrical, large amplitude, shaking of the head and all four limbs in the sagittal plane in a position of mid-flexion. There was no tonic phase, tongue biting, incontinence or desaturation. With time, she became somewhat responsive to simple commands between episodes, with little evidence of a classical post-ictal phase.

At this stage, a more thorough analysis of the extensive notes and a helpful telephone discussion with her neurologist suggested a large psychological component to her general condition, to the extent that her diagnosis of Jacksonian epilepsy had recently been questioned and ‘pseudoseizures’ suspected, on the basis of her clinical picture. Certain anticonvulsants had been stopped for a trial period 2 months earlier. During the following hour, she began to respond further, albeit intermittently, to simple command in between the episodes, and we tried to give reassurance and support throughout. Three hours after starting, the convulsions had completely ceased, revealing a vulnerable, stressed but receptive patient doing her best to control her anxiety. Continuing with the reassurance, we were then able to proceed with the awake adjustment of the squint sutures with her full cooperation.

**Discussion**

Postoperative generalized shaking is usually because of shivering, which may be thermoregulatory or non-thermoregulatory. The latter is thought to be secondary to the effects of volatile anaesthetics, pain or both. The movements generated by shivering can be severe and may even mimic a generalized seizure. Shivering is common after surgery with a stated incidence of 5–70%, and is usually easy to diagnose. Postoperative seizures (except after neurosurgery), however, are rare events and thus tend to be cited only in case reports. When they do occur, they are usually attributable to an identifiable drug reaction, or a metabolic or neurological event. Certain anaesthetic drugs cause dystonic movements or epileptiform activity, but anaesthetic drug-induced convulsions are rare. The incidence of post-neurosurgical seizures is higher and ranges from 4% after aneurysm surgery to 13.5% after brain tumour surgery.

Another cause of generalized shaking, psychogenic seizures, appears to be not uncommon in the postoperative period. These are attacks resembling grand mal fits but are not associated with abnormal electrical discharges in the brain. Pseudoseizures in general tend to follow a certain pattern; there may be a history of convulsions and/or status, and a background of psychosomatic illness. Convulsive episodes tend to be flamboyant, to last longer than 90 s with asynchronous limb movement, side-to-side head movement, closed eyes with resistance to eye opening, and retained pupillary responses. Release of the arm over the head is often purposely modified during psychogenic attacks. There is usually no cyanosis, but there may be incontinence and tongue biting. Consciousness may be fluctuating or blunted. The episodes may settle with reassurance. There is an absence of the usual post-ictal period. The episodes tend to become more violent with time, to occur in the presence of doctors, and to be aggravated by the use of anticonvulsants. It is possible for both epileptic and psychogenic seizures to coexist. One study of mixed seizure disorders suggested that 10% of patients had both. Clinical observation has long been used to differentiate epileptic seizures from pseudoseizures. This is not always reliable; however, and in recent years diagnosis has been aided by the use of video-EEG monitoring, serum prolactin levels, and neuropsychological assessments. Unfortunately, these investigations also have limitations, and most cases of pseudoseizures managed by our tertiary referral neurological centre are still based on a clinical diagnosis alone. This is because of the difficult logistics of
pseudoseizure investigation, financial or facility constraints, and the relative sensitivity of clinical diagnosis in their hands. Pseudoseizures are serious and may be complicated by prolonged pseudostatus, and possibly resistant to treatment. Respiratory arrest in pseudostatus patients treated with i.v. anticonvulsants has been reported. There have been reports of patients who have been intubated, ventilated and transferred to intensive care with postoperative pseudoseizures.17 20

Our case was complicated by the history of a perioperative cerebral venous thrombosis manifesting as postoperative seizures, the history of epilepsy since that event, and the partial reversal of anticoagulation. In addition, certain features of her pseudoseizures were unusual or of interest. In particular, the start of the convulsions before emergence from general anaesthesia and their continuation after recovery from anaesthesia, the sagittal plane of seizure movement, the short duration of the convulsions, the absence of biting thus allowing removal of the LMA, and the absence of resistance to eye opening. It seems reasonable to assume that the pseudoseizure may have been provoked and the presentation modified by the residual effects of general anaesthesia. If the clinical picture or subsequent progress had dictated, an EEG reading and serum prolactin measurement would have been performed. Neither test is absolutely sensitive or specific, however, and would not have yielded immediate results.

One should perhaps question the wisdom of proceeding with general anaesthesia in a patient with her complex medical background for such a non-life-threatening condition. In retrospect, preoperative multidisciplinary discussions and a more thorough assessment would have been of great benefit. One could also question whether the LMA should have been removed or left in place when the convulsions started; there are arguments for either course of action. We felt that removal would aid assessment of the airway and ventilation, and would decrease the risk of laryngeal spasm, trauma and obstruction.

Misdagnosis and mismanagement of the convulsions could have resulted in potential morbidity and would have disrupted her surgical management. It has been suggested that a preoperative neurological review may well be indicated if a patient gives a history of previous postoperative ‘status epilepticus’, or of several episodes of ‘status’ leading to emergency admission.12

At follow-up in the neurology clinic 3 months later, she had developed an acute pseudoparesis. Such hysterical neurological deficits are strongly associated with pseudoseizures.12 We were asked about the potential risks associated with anaesthesia should it be required in the future and how this should be communicated and managed. We proposed preoperative multidisciplinary input, the avoidance of epileptogenic anaesthetic agents, the use of a simple anaesthetic technique involving only the minimum required quantities of preferably short-acting agents, along with high levels of perioperative psychological support throughout. Pseudoseizures, should they occur, are to be managed primarily by reassurance rather than sedatives or anticonvulsants, which may serve to prolong the event. In addition to explanation, counselling and note-keeping, we elected to write a letter for her to present in the future if required, outlining her history and anaesthetic risk factors.

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